DOCUMENT RESUME

ED 290 044 CE 049 432

AUTHOR Ryan, Ray D.
TITLE Impact on Technology. Evolving Directions on the International Scene.
PUB DATE 7 Dec 87
NOTE 9p.; Paper presented at the American Vocational Association Convention (Las Vegas, NV, December 6-10, 1987).
PUB TYPE Viewpoints (120) -- Speeches/Conference Papers (150)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Educational Change; *Educational Needs; *Futures (of Society); Global Approach; *Labor Needs; Secondary Education; Student Centered Curriculum; *Technological Advancement; *Vocational Education

ABSTRACT

Not only are economic, political, social, and technological changes occurring constantly throughout the world, but the rate at which they are occurring is increasing rapidly. The ever-increasing pace of technological change is especially evident in transportation and computer technology, both of which have brought the different ends of the earth closer together than ever before. The time has come to resist political pressures to raise and lower curriculum standards and to realize that the developed nations of the world (the United States and Western Europe) share common interests with the developing nations of Asia, Latin America, and Africa. Education's "return to basics" must not be at the expense of the job training that is needed to meet changing business needs. Vocational and technical education teachers must endeavor to create a new kind of worker--the "knowledge worker." Knowledge workers are workers who, because of their increased problem-solving skills, adapt easily to group settings, are more innovative than other workers, possess a high level of self-motivation and self-esteem, and exercise some choice over their work methods and work environments. Although knowledge workers do not require specific degrees with a specific number of units in a content area, they must know how to think, evaluate, cooperate, change, and deal with changes. Today's teacher-centered classrooms must give way to student-centered laboratories that will focus on leadership, multi-job, participatory, job-specific, and company-specific skills. (MN)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED290044

IMPACT ON TECHNOLOGY
"Evolving Directions on the International Scene"

Presented to the
International Vocational Education and Training Association
American Vocational Association Convention
December 7, 1987

Presented by:

Dr. Ray D. Ryan
The National Center for Research in Vocational Education
1960 Kenny Road
Columbus, Ohio 43210

CE049432

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

☐ This document has been reproduced as received from the person or organization originating it.

☐ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

P Ryan

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

BEST COPY AVAILABLE

It is no mistake that the National Center for Research in Vocational Education is here today, as we are vitally concerned with the international arena. We have been interested and involved for years with educators and policymakers from all around the world. But we are even more concerned today. The world is a different place than it was twenty years ago when the National Center began. We are different than it was ten or even five years ago.

Change in the international arena has been so profound just within our lifetime that it illustrates one of the fundamental axioms of life. It is paradoxical but true that the only certainty about the future is the uncertainty about the future. The only stable process in the universe is change. And look at how the international "rule book" has changed in recent years. Countries which were once the exporters to the world, now have economies which are riddled with a severe trade deficit.

Once countries that were unquestioned world leaders in technology, manufacturing, and productivity, those same countries now compete with nations that were primarily agricultural or non technology focused only a few years ago. A very few years ago!

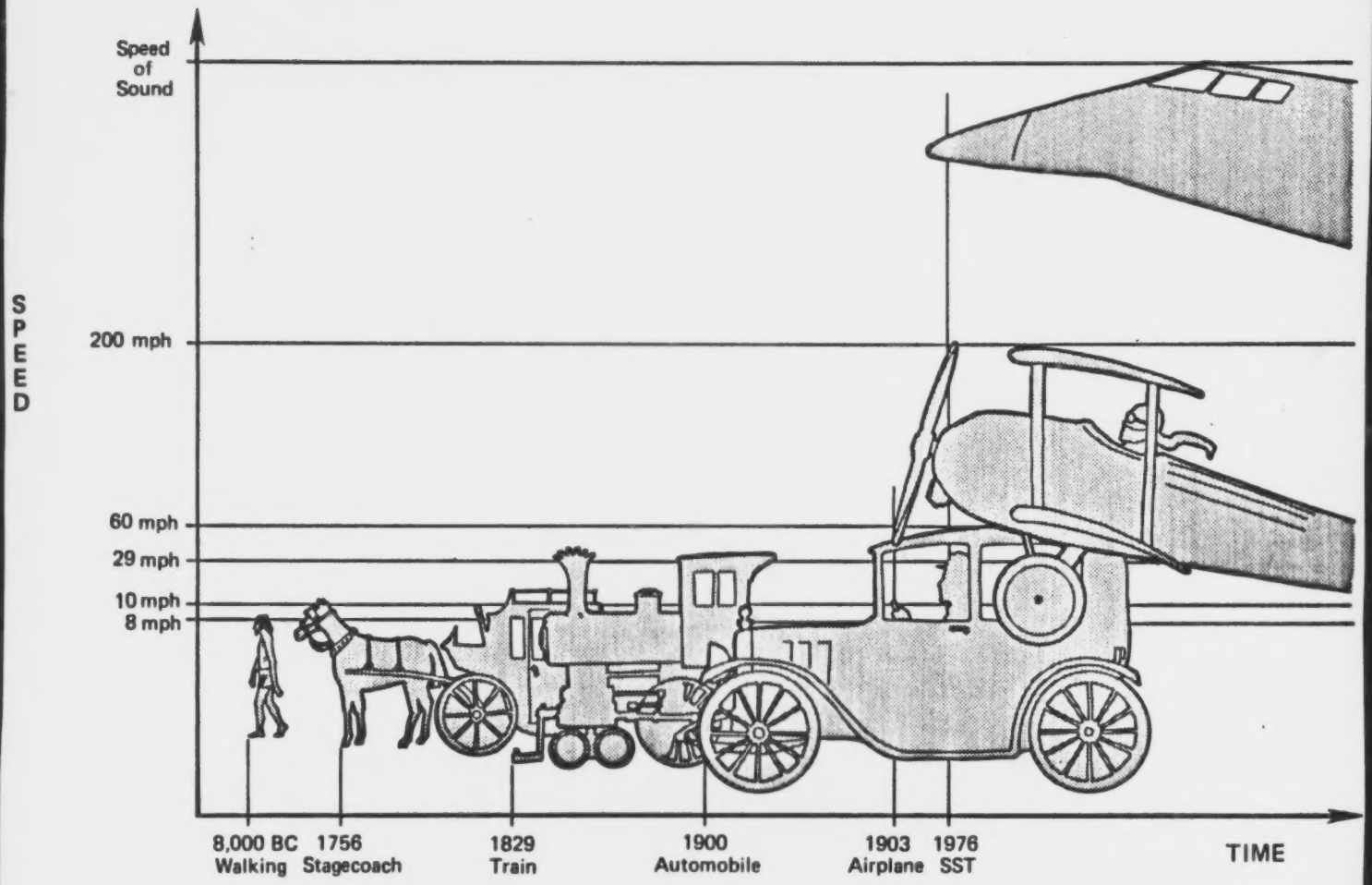
A corollary to our previously discussed axiom, then, is that not only is change the only constant, but the rate of change is increasing rapidly.

- o *Economic changes,* where the once weak are challenging the industrial giants.
- o *Political changes,* where the old order is giving way to new demands of nationhood and equity in international affairs.
- o *Social changes,* the nations of the world facing unprecedented internal strains as new problems threaten established systems.
- o And, of course, *technological changes,* where work and production are performed by means barely conceived only a few years ago, driven by a revolution that for which there is no end in sight.

Let's examine for a moment the effects of these technological changes, illustrated by the transportation industry and shown in figure 1.

From the beginning of time until about 1650, the fastest humans could travel was 8 mph, the speed of a camel on a good roll. Then the stagecoach was introduced, improving our land speed by all of 2 mph and only when conditions were favorable. 200 years later, a train named "The Rocket" recorded the unprecedented speed of 29 mph.

Then came the twentieth century. The automobile, starting at 20 mph, rapidly changed. In only 30 years, it attained what we now know as highway speeds. They now reach over 200 mph. Air travel began at the same time. We now look at films of people with wings jumping off of barns and crashing to the ground, and we think it's hilarious.


SPEED
Speed of Sound
200 mph
60 mph
29 mph
10 mph
8 mph
8,000 BC Walking
1756 Stagecoach
1829 Train
1900 Automobile
1903 Airplane
1976 SST
TIME

Let me tell you something. Those "fools" who were trying to fly were creating the context for something we absolutely take for granted today, transcontinental aircraft which routinely break the sound barrier. A recently developed military plane reaches speeds over twice that, in the same century! And instead of speed doubling every 300 years, try every 5 or 10!

If you think transportation is unique, consider the computer. Many of us have in our homes a capability that exceeds the power of the most exotic and sophisticated computers on the planet in the '50's and '60's.

My point is this. We can all understand the technological changes around us. I ask you to consider that when technology changes, so does everything else, economics, societies, politics, ecology, anything you can conceive of. Now, you may ask, I am an educator, what does all this have to do with my life or my job?

My answer is simple and straight-forward. It has everything to do with your life, and your job. It has to do with who your students are, who you will teach. It has to do with what you will teach them. It concerns how the nations of the world will relate to one another, whether we will cooperate or compete, whether we will have war or peace, whether we will join together for mutual success or view the accomplishment of others to the detriment of ourselves.

We are talking about a you and me world, not you or me. We are talking about teachers and students becoming learners. It means that both employer and employee must come together. It means that the United States and Western Europe and Asia and Latin American and the emerging nations of Africa and the rest of the world will see a commonalty of interests.

The alternative is, of course, none of the above. It is a vision of catastrophe, of depression, of illiteracy, of dislocation. It is our choice. Either progress or business as usual.

If education continues to be a reactive institution, if we raise and lower curriculum standards in response to political pressures rather than projected business needs; if we go "back to the basics" at the expense of job training; if we ignore the needs of business and industry, we know what will occur.

Our students will become increasingly unable to realize their own needs and interests. But if we proactively choose our destiny, a vastly different vision of the future emerges. A world that works and people that work in it. A world in which nations recognize their genuine interdependence. A world where teachers can teach, students can study, employers can profit, and people can life in peace.

Now, I'm not so naive as to think that anything I say is going to make a difference. And probably, if you all go home with the same message, that probably won't make any different. But what about if we change the approach of our individual programs. What if those of us who are administrators begin to say to those pressures groups, "Sorry. I make the decisions." Educators must recognize that no one can do it without the other. You begin to get the idea.

We need to put the vision to work in our own jobs and our own lives. For vocational-technical education the essence of a new kind of worker is needed for the challenges ahead, one called the "knowledge worker."

From the point of view of the United States, it is true that most of the unskilled and semi-skilled assembly is going abroad. New jobs are being created here at a record pace, according to the U.S. Department of Labor, and it is not going to other nations in the same form it left. It involves robotics, Cad/Cam, microchip technology, and high-speed assembly. Thus, the kind of worker needed in the United States and abroad is the same.

As shown in exhibit 1 the "Knowledge Worker" is described as having the following characteristics:

- Most knowledge workers adapt easily to group settings and function well in groups.
- Because of better education and greater opportunities to develop problem-solving skills, most knowledge workers are more innovative than other workers.
- In most of their endeavors . . . knowledge workers are evaluated on their ability to solve problems.
- Knowledge workers appear to possess a high level of self-motivation and self-esteem.
- For knowledge workers to be task effective, they must have a degree of freedom in choosing the work methods and the environments in which they function.

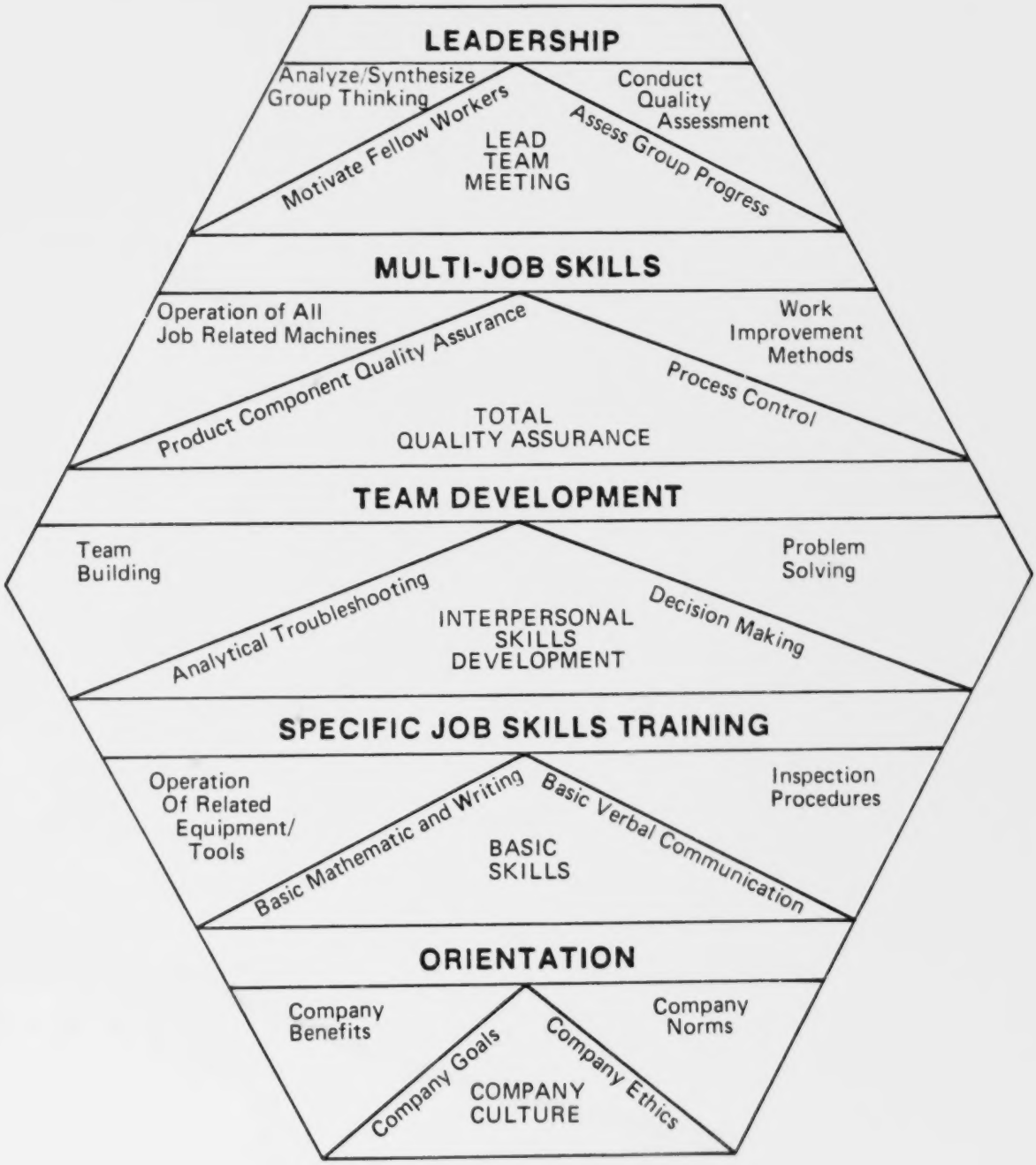
You will note that these workers are not unskilled workers, they are high skilled employees. They don't require specific degrees with a specific number of units in a content area. But they have to know now to think, evaluate, cooperate, change and deal with change.

These skills can be learned within an educational program or as a series of short-term training sessions. It doesn't matter what the system is that produces these workers, only that it be continuous and reinforced by the educational community. Today's classroom will be tomorrow's environment of discovery and interaction. The teacher-centered environment of today will give way to the student-centered laboratory of the future. The environment will focus on the following five areas: leadership, multi-job skills, participatory skills, specific job skills, and company specific job skills (figure 2).

You will doubtlessly see that no specific curriculum, at least in today's view of what a curriculum is, is defined. The knowledge worker is not about content, it is about <u>context</u>. We must develop qualities of knowledge, not quantities of knowledge. We need to train workers who are, in the words of John Sculley, the chief executive officer of Apple Computers, " . . . not computer experts but ordinary people who . . . discover they can do extraordinary things." We can and must train these kinds of workers.

CHARACTERISTICS OF A KNOWLEDGE WORKER

- MOST KNOWLEDGE WORKERS ADAPT EASILY TO GROUP SETTINGS AND FUNCTION WELL IN GROUPS.
- BECAUSE OF BETTER EDUCATION AND GREATER OPPORTUNITIES TO DEVELOP PROBLEM-SOLVING SKILLS, MOST KNOWLEDGE WORKERS ARE MORE INNOVATIVE THAN OTHER WORKERS.
- IN MOST OF THEIR ENDEAVORS . . . KNOWLEDGE WORKERS ARE EVALUATED ON THEIR ABILITY TO SOLVE PROBLEMS.
- KNOWLEDGE WORKERS APPEAR TO POSSESS A HIGH LEVEL OF SELF-MOTIVATION AND SELF-ESTEEM.
- FOR KNOWLEDGE WORKERS TO BE TASK EFFECTIVE, THEY MUST HAVE A DEGREE OF FREEDOM IN CHOOSING THE WORK METHODS AND THE ENVIRONMENTS IN WHICH THEY FUNCTION.



Model for Employment and Training Renaissance: "The Knowledge Worker"

Adapted from William Fechter's CIM Knowledge Worker Model

This is a most exciting time to be a participant in change. No two nations are the same, no two cultures duplicate one another. But the issues that divide us are far less significant than those that unite us. This will become even more so as distances between us shrink.

It is a new day for vocational-technical education as well. It is time for a new response to the challenges ahead. It is time for a context which involves the sharing of goals in an increasingly interdependent world and a harmony of initiatives. I believe it is within our power to create such a context. I believe that it is possible, perhaps for the first time, to create a world that works for everyone and every nation.

The calling to do this requires us to contribute ourselves fully to this vision of the future. I believe we can and will do this. I believe the world will make it.